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(56) Documents Cited

GB 2307267 A

GB 2268216 A

GB 2252122 A

GB 2250770 A

GB 2248262 A

(58) Field of Search

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(54) Diverter valve for waste water recycling assembly

(57) Apparatus for recycling waste water includes a waste pipe 12 from e.g. baths 10 and wash basins 11, leading via a diverter valve 13 either to a stored vessel 18, which may also function as a rainwater butt, and a soil stack 16. Fouled waste may be diverted from the vessel 18 to the soil stack by the valve 13.

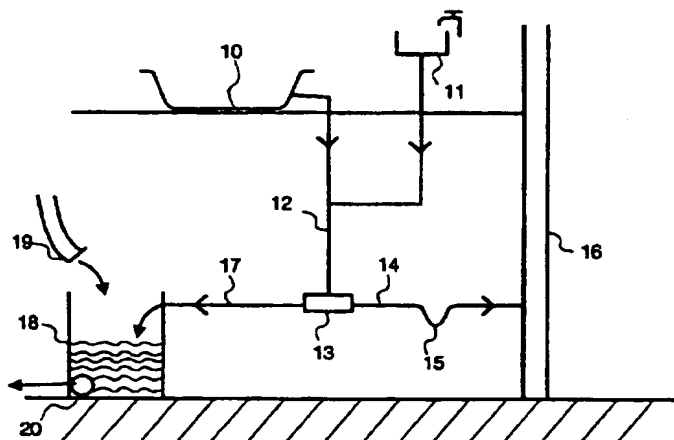


Fig. 1

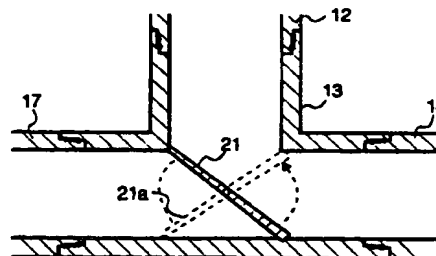


Fig. 2

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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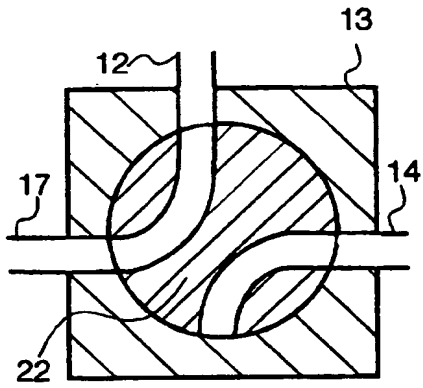


Fig. 3a

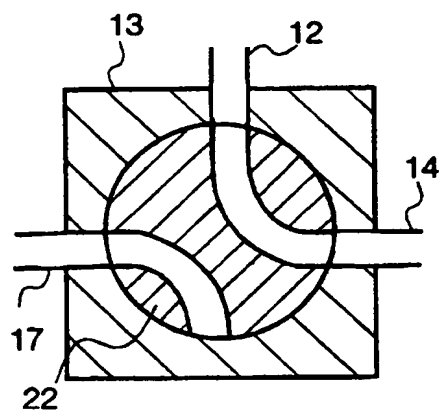


Fig. 3b

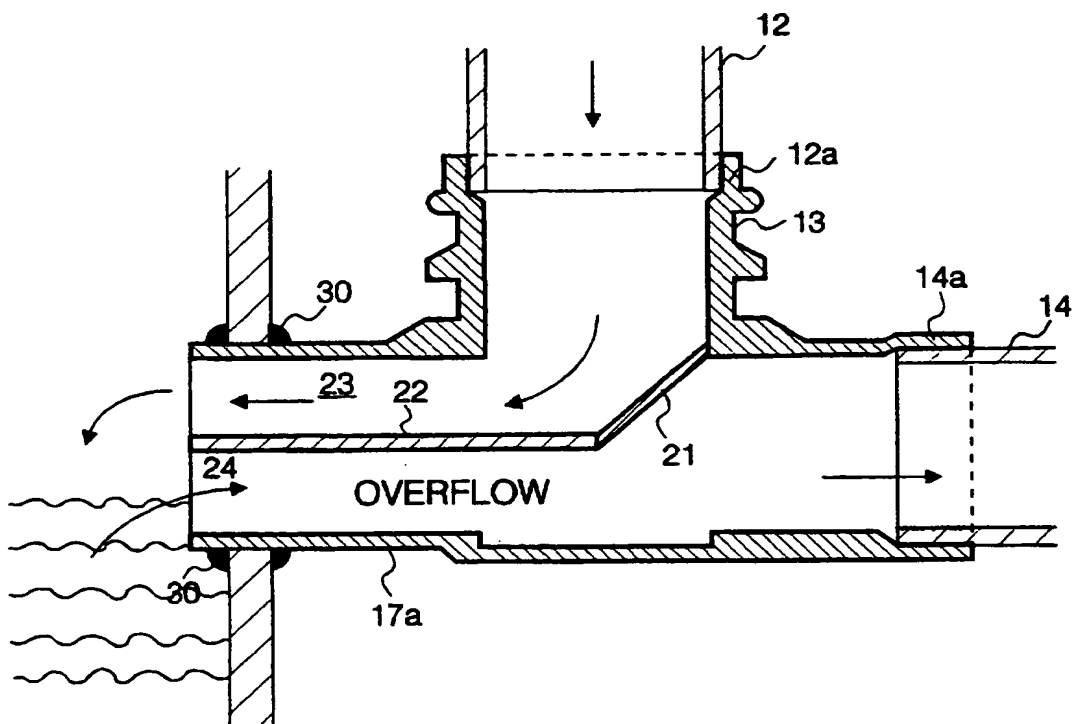


Fig. 4

UTILISATION OF WASTE WATER

This invention relates to the utilisation of waste water.

Household waste water generally falls into two categories - soiled water, generally from WCs and the like which may include urine and fecal material, and 'grey' waste, water which only has been used for personal washing, or laundry, and includes a small proportion of soap and some dirt, such as the effluent from baths and wash basins.

In an era when pressure on potable domestic water supplies is increasing, from increasing demand and from erratic rainfall, it is more and more seen that many domestic water uses, such as car washing and watering lawns and gardens and flushing lavatories, are wasteful if carried out using potable quality water. Increasingly, it is acceptable that such uses may be met as a second use of a recycled water supply.

Clearly it is out of the question to reuse water coming from sources such as WCs which is unacceptably polluted, but 'grey' effluents are generally speaking reusable without needing expensive purification, and without posing a substantial health or environmental hazard, or causing revulsion.

An object of the invention is to provide a means whereby such recycling may be accomplished.

In accordance with the invention, a waste pipe from a bath and/or wash basin is connected via a change over valve means alternatively to a storage vessel for waste water, and directly or indirectly to a domestic soil stack.

The valve means may be a simple two-position valve, having a closure member which can be moved between to alternative positions in response to a control mechanism which may be located so as to be accessible, e.g. from a kitchen or bathroom location, even when the valve itself is not readily accessible.

Preferably, all the baths and wash basins in a house have their outflows connected to a common waste pipe which leads to the valve.

The storage vessel may be a butt which also functions as a rainwater butt to collect rainwater running off a roof of the house.

The valve means may provide a flow into the storage vessel combined with an overflow from the vessel directly or indirectly to the waste stack.

It may be considered necessary to divert water from the waste pipe away from the butt to the soil stack either when the butt is completely filled after a period of heavy rainfall, or when unacceptable wastes are about to be introduced into the waste pipe, e.g. when using turpentine or white spirit to clean brushes, clothes and person at the end of a decorating session. The diverted water or overflow may be supplied to the cistern of a lavatory for use in flushing, after which it passes to the soil stack.

The rainwater and ordinary 'grey' waste can be abstracted from the butt as needed for tasks such as watering a lawn or garden, or washing a car, using traditional watering cans or a pump and hose pipe.

A preferred embodiment of the invention will now be described by way of example, with references to the accompanying drawings, wherein:-

Fig. 1 is a diagrammatic view of the apparatus of the invention:

Fig. 2 is a view of a first embodiment of change-over valve;

Figs 3a and 3b show alternative positions of a second embodiment of changeover valve; and

Fig. 4 is a detail view of a modified embodiment of the invention.

As shown in Fig. 1, waste water from a bath 10 and one or more wash basins 11 is fed to a common waste pipe which is connected to a changeover valve 13. This valve can direct flow from the waste pipe 12 alternatively either via a pipe 14 with a trap 15, to a domestic soil stack 16, which in turn leads from a household WC etc., to a sewer (not shown) below ground level; or via a pipe 17 to a water butt 18. This butt is also disposed to collect rainwater run-off from the roof of the house, by way of a spout 19. A pump 20 may be provided in the butt 18 to feed water on demand through a house e.g. for car washing, watering a garden, or sprinkling a lawn.

As is shown in Fig. 2, a first embodiment of the valve 13 is a simple change-over type, using a vane or butterfly valve member 21, provided with alternative seats with

respective sealing rings. In the full-line position, valve member 21 directs flow through pipe 14 to the soil stack 16. In the broken line position 21a, flow is diverted by pipe 17 to the butt 18. Change-over of the valve may be effected directly by a lever, or where the valve is not easily accessible, through a mechanical linkage, or by a solenoid or electromagnetic control which is operable from the kitchen or bathroom.

Figs 3a and 3b show a second embodiment of valve, with a rotary valve member 22 in a circular valve chamber. The valve member has two curved passages 23, 24. The valve member 22 is rotatable through a right angle, defined by stops, not shown, between the position of Fig. 3a to the position of Fig. 3b. In the Fig. 3a position, passage 23 connects waste pipe 12 to the pipe 17, leading to butt 18. In Fig. 3b, the passage 24 connects waste pipe 12 to the pipe 14 leading to the soil stack 16. In an outlet system with an upstairs bathroom, the head pressure of water is sufficient to run a hose or sprinkler without need for a pump, direct from a tap or hose adapter connected into pipe 17,, or to the, or an additional outlet from the change-over valve 13.

In Fig. 4 a modified embodiment is shown, which provides a feed into and overflow from a butt 18. The valve body 13 discharges directly into the butt 18, the pipe 17 being effectively reduced in the length of the corresponding outlet spigot 17a of the valve body 13. A seal 30 is provided about the spigot 17a where it passes through a correspondingly sized aperture in the wall of the butt 18. The valve 13 is diverted by a diverter 21 and a partition 22 which divides spigot 17a into a top part 23 and a lower

part 24. The valve body 13 also has spigots 12a, 14a for connection to the inlet pipe 12 and the stack pipe respectively.

The water level in the butt 18 can rise to the level of the inlet from the upper part 23 of spigot 17a, and the overflow thus created passes into the lower part 24, and flows via spigot 14a and pipe 14 to the stack pipe.

In another embodiment of the invention, A change over valve according to Fig. 1 or Fig. 3, or an overflow valve according to Fig. 4 may be connected to a lavatory cistern instead of to the soil stack, so that the water may be used for flushing the lavatory.

In the case of an overflow valve of the Fig. 4 type, the water directed to the lavatory cistern may be either outflow from domestic baths and wash basins, or overflow including rainwater from the butt 18.

Clearly, variations in the apparatus may be made within the scope of the invention, with groups of washbasins etc. being connected to separate or common waste pipes.

In particular, the valve may be any type of valve which will perform the function required - an oscillating vane valve or a longitudinally sliding spool valve for example.

Each bath, wash basin, etc., wash pipe may of course be separately connected to the or a respective storage vessel, but in most domestic uses this would be uneconomic. The storage vessel may not of course be a rainwater collecting butt, where local rainfall is not significant, or conditions or roof or roof configurations are unsuitable for rainwater collection.

Claims

1. **Waste water recycling apparatus wherein a waste pipe from a bath and/or wash basin is connected via a change-over valve means alternatively to a storage vessel for waste water, and to a domestic soil stack.**
2. **Apparatus according to Claim 1 wherein storage vessel by a change over said valve means can be operated to divert waste water from the storage vessel to the soil stack.**
3. **Apparatus according to Claim 2, wherein the valve means comprising a two position valve, having a closure member which can be moved between two alternative positions in response to a control mechanism.**
4. **Apparatus according to Claim 3 wherein said control mechanism is located so as to be accessible even when the valve itself is not accessible.**
5. **Apparatus according to Claims 1 or 2 wherein all the baths and wash basins in a house have their outflows connected to a common waste pipe which leads via the valve means to the storage vessel.**

6. Apparatus according to my preceding claim, wherein the storage vessel is a butt which also functions as a rainwater butt to collect rainwater running from a roof of the house.
7. Apparatus according to Claim 1, wherein the valve means provides for a permanent flow to the storage vessel and overflow from the vessel to the waste stack.
8. Apparatus according to Claim 7, wherein said valve means has a diverter, and an outlet into said storage vessel divided by a wall to provide an inflow into, and an overflow from the vessel to either side of said wall.
9. Apparatus according to any preceding claim wherein the waste water can be diverted to a lavatory cistern for use in flushing the lavatory, before passing to the soil stack.
10. Waste water recycling apparatus substantially as herein before described with reference to and as illustrated in Figs 1 to 3, or Fig. 4, or Fig. 5, of the accompanying drawings.



Application No: GB 9711390.6
Claims searched: 1-10

Examiner: D. Haworth
Date of search: 26 August 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E1X (XK1)(XK7K)

Int Cl (Ed.6): E03B 1/04, 7/07

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2268216 A (Blye et al)	1-10
X	GB 2252122 A (Fieldhouse et al)	1-10
X	GB 2250770 A (Milligan)	1-10
X	GB 2248262 A (Embley et al)	1-10
A	GB 2307267 A	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.